

(12) **UK Patent Application** (19) **GB** (11) **2 211 506**<sup>(13)</sup> **A**  
 (43) Date of A publication 05.07.1989

(21) Application No 8725046.0

(22) Date of filing 26.10.1987

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(51) INT CL<sup>4</sup>  
**F16L 47/00 37/16**

(52) UK CL (Edition J)  
**C3V VED  
 C3W W323 W330  
 F2G G111 G31 G31B  
 U1S S1885 S1976 S1978**

(56) Documents cited  
**None**

(58) Field of search  
**UK CL (Edition J) C3V VED VEK VEX**

(54) **Tube coupling bodies**

(57) The disclosure relates to a tube coupling body (10) having a bore (11) extending between upon ends (12), a central rib or ridge (13) and one or more stepped reductions, (14, 15) in the outer diameter of the coupling body, with the wall thickness of the body being substantially uniform throughout. The body is formed as an injection moulding of a polysulphone plastics material so as to be inert to domestic tap water and thus is suitable for use in domestic water installations. A coupling (see Fig 4) incorporating such coupling body in the form of a TEE connector includes insert sleeves (17) secured in the open ends of the body having cam surfaces in which collets (18) are engageable to receive and lock tubing, with "O" ring seals (19) being located against steps (15).

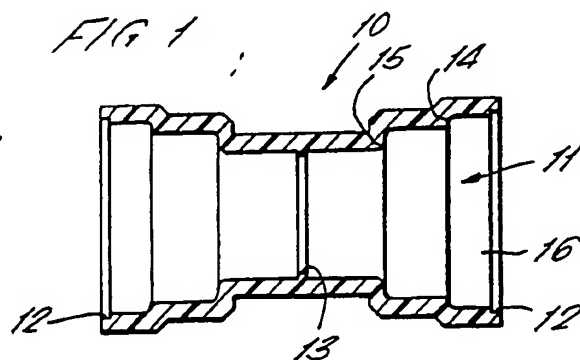
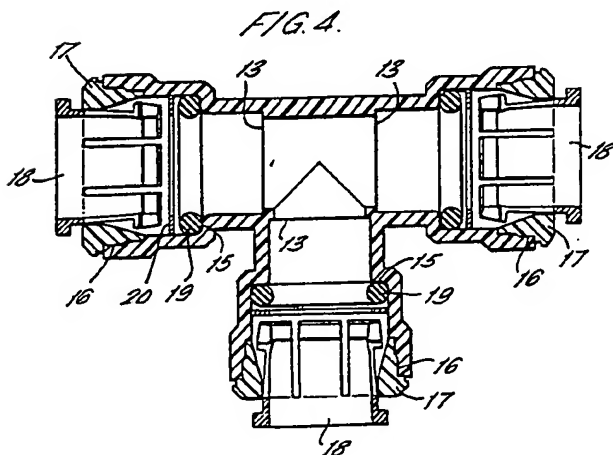


FIG. 1.

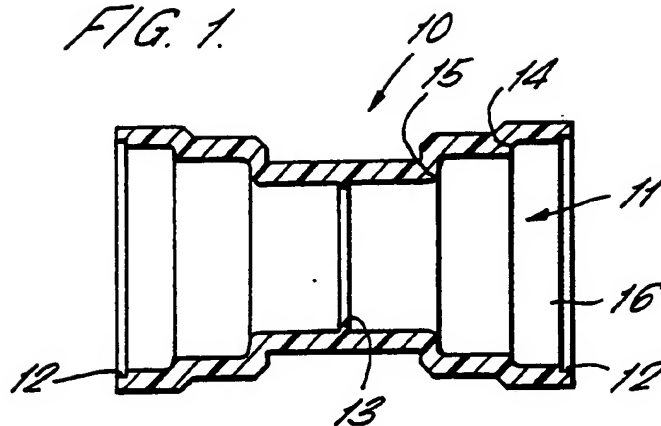


FIG. 2.

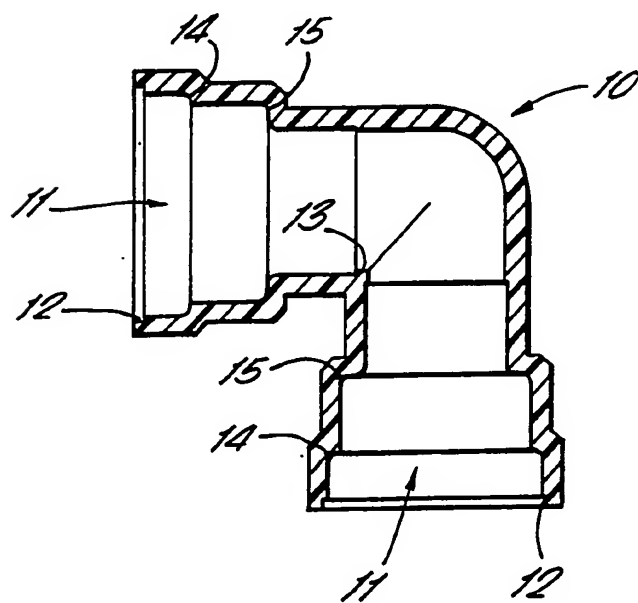


FIG. 3.

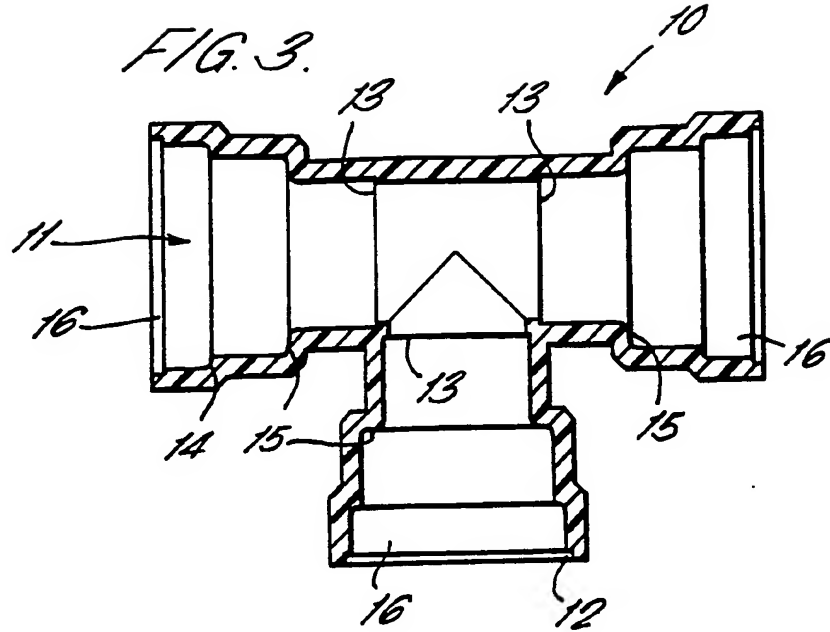
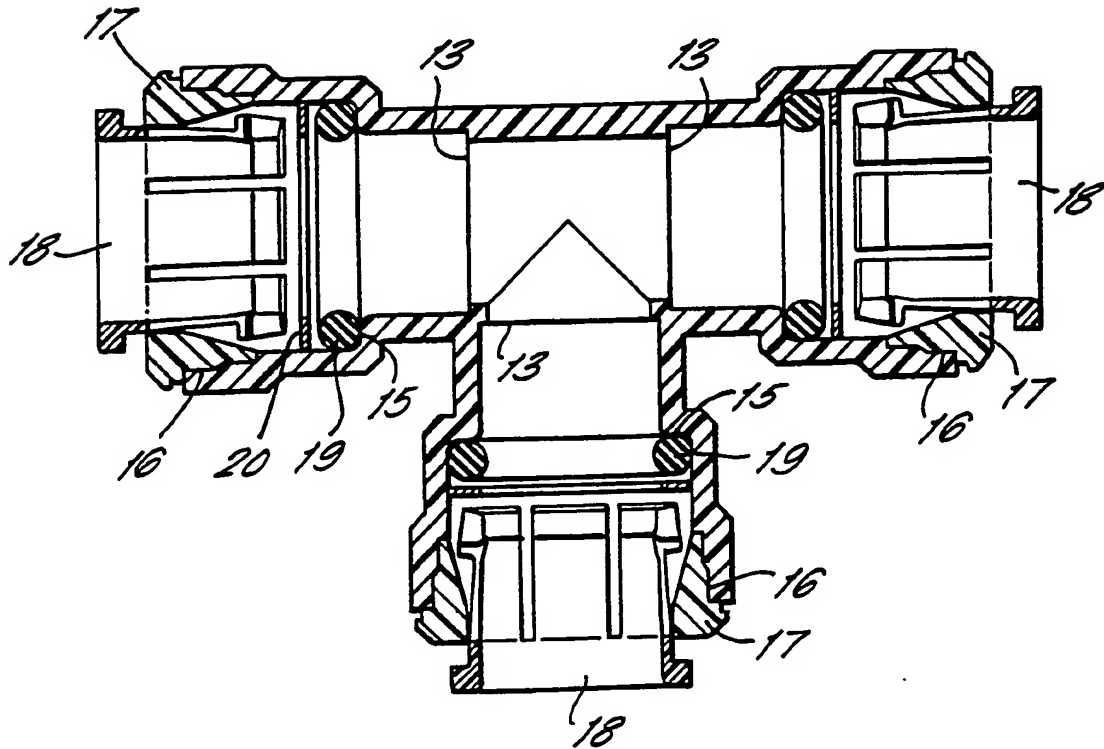


FIG. 4.



IMPROVEMENTS IN OR RELATING TO TUBE COUPLING BODIES

5 This invention relates to tube coupling bodies  
for tube couplings of the type in which the coupling  
body has a throughway open at one end to receive a  
tube with a internal tapered cam surface converging  
towards the open end of the body in which a collet is  
disposed with resilient arms which engage the tapered  
cam surface to be forced inwardly thereby to grip and  
10 hold a tube in the body. One such coupling body is  
described and illustrated in our U.K. Patent No.  
1520742. Hitherto such couplings have been  
developed for a wide variety of applications  
including pneumatic and fluid systems but suitable  
15 couplings have not been available for plumbing and  
heating applications involving potable water, hot  
water for domestic use and hot water for heating  
purposes.

20 The invention provides a tube coupling body  
having a bore extending into the body from an open  
end thereof, one or more stepped reductions in the  
diameter of the bore between said open end and said  
end, a corresponding reduction or reductions in the  
25 diameter of the outer surface of the body whereby the  
wall thickness of the body is substantially uniform  
throughout and the body being formed as an injection  
moulding in a polysulphone plastics material.

30 The combination of a polysulphone plastics  
material for the coupling body with a more uniform  
thickness for the coupling body throughout combines  
the requisite properties of an inert material with  
respect to the water passing there through which has  
35 an adequate life expectancy of service and in which,  
by virtue of the uniform wall thickness, minimising

residual stresses in the body.

The following is a description of some specific  
embodiments of the invention, reference being made to  
5 the accompanying drawings in which:

Figure 1 is a sectional view of one form of  
tube coupling body according to the invention;

10 Figures 2 and 3 are sections through further  
forms of tube coupling bodies; and

Figure 4 is a section through a complete form  
of coupling embodying the coupling body of Figure 3.

Referring firstly to Figure 1 of the drawings,  
15 there is shown a tube coupling body indicated  
generally by the reference numeral 10 for a tube  
coupling the type described and illustrated in our  
U.K. Patent No. 1520742. The coupling body  
illustrates generally cylindrical form produced as an  
20 injection moulding in polysulphone plastics. The  
body has a bore 11 extending through the body between  
open ends 12 at opposite ends of the body. At the  
centre of the body the bore has an encircling  
integral rib 13 which forms an end for the ends of  
25 the two tubes to be inserted into the body through  
the openings 12 at either end thereof.

Between each open end 12 of the body and the  
central ridge 13 the bore reduces in diameter at  
30 based steps 14 and 15. The external cylindrical  
surface of the body has corresponding steps reducing  
the external diameter of the body whereby the wall  
thickness of the body is substantially uniform  
throughout. This minimises the effect of stresses  
35 imposed in the plastics material of the body in the  
moulding operation and in subsequent heating and

cooling of the body by virtue of materials conducted through the body.

5           The part 16 of the body between the open end 12  
and step 14 receives an insert sleeve formed with a  
tapered cam surface converging towards the open end  
of the body and the sleeve is secured in the bore by  
ultrasonic welding to form a integral structure with  
the bore.   The tapered cam surface acts on the  
10   resilient arms of a collet located in the end of the  
coupling body to lock a tube in the body.   An "O"  
ring seal is located against the step 15 in the body  
to seal with a tube extending through the bore.

15           Figure 2 of the drawing shows a similar  
arrangement in which the body is formed with the  
right angle bend to provide elbow connector it would  
be appreciated in this case the ridge formed at the  
centre of the body extends around the full bend of  
20   the elbow.

          Figure 3 of the drawings shows a further  
variation in which the coupling body 10 is in the  
form of a TEE connector with three walls extending  
25   into the coupling body to receive three tubes to be  
connected therein.

          Figure 4 shows the coupling body of Figure 3  
with the aforesaid insert sleeves designated 17  
30   located at the open ends of the coupling body, the  
collet 18 in place in the open ends of the body and  
the "O" ring seals 19 located against the steps 15.  
In addition annular washers 20 are provided adjacent  
the seals and formed from polysulphone plastics to  
35   remove any extraneous matter from the outer surfaces  
of the tubes prior to entry into the "O" ring seals.

CLAIMS

1. A tube coupling body having a bore  
extending into the body from an open end thereof, one  
5 or more stepped reductions in the diameter of the  
bore between said open end and said end, a  
corresponding reduction or reductions in the diameter  
of the outer surface of the body whereby the wall  
thickness of the body is substantially uniform  
10 throughout and the body being formed as an injection  
moulding in a polysulphone plastics material.

2. A tube coupling body as claimed in Claim  
1, wherein the body has at least two spaced stepped  
15 reductions in diameter between the open end of the  
body and the tube end, the portion of the bore  
between the first step and open end of the body  
providing a socket for receiving a cam sleeve to be  
integrated with the wall of the body within which a  
20 collet for gripping a tube may be located and the  
portion of the bore between the two steps being  
intended to be a sealing ring for sealing engagement  
with the tube to be received in the body.

3. A coupling body as claimed in Claim 1 or  
Claim 2, wherein the body has a plurality of such  
bores which communicate within the body between the  
25 respective end stops of the bores.

4. A tube coupling as claimed in Claim 3,  
30 wherein the body has two such bores.

5. A tube coupling as claimed in Claim 4  
wherein the bores a coaxial extending into the tube  
35 coupling from opposite ends thereof, the coupling  
having a cylindrical central portion within which

there is a encircling ridge defining end stops facing in opposite directions along the bore for the tube ends to be inserted into the bore.

5           6.     A tube coupling as claimed in Claim 4, wherein the axis of the bores extend into the coupling body at right angles to one another whereby the body is in the form of an elbow.

10           7.     A tube coupling as claimed in Claim 3, wherein the body has three such bores extending into the body from respective open ends whereby the coupling body provides a TEE connector.

15           8.     A coupling body as claimed in any preceding claims, wherein an insert sleeve is located in the or each bore adjacent the open end thereof and is integrally connected with the encircling wall of the body, the insert sleeve having a tapered cam  
20 surface converging towards the end of the body to receive a collet having resilient arms to be engaged by the cam surface to cause the arms to deflect inwardly and grip the tube within the bore.

25           9.     A tube coupling body substantially as described with reference to and as illustrated in Figure 1, Figure 2, Figures 3 and 4 in the accompanying drawings.

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